

CLAIMS

SJP B14 7
1 An isolated nucleic acid obtainable from the FRI locus
of a plant, which nucleic acid encodes a polypeptide which is
capable of specifically altering the flowering time of a
plant into which the nucleic acid is introduced.

SJP B14 10
2 A nucleic acid as claimed in claim 1 which is capable of
delaying the flowering time and thereby extending a
vegetative phase in the plant.

SJP B14 15
3 A nucleic acid as claimed in claim 1 or claim 2 which
comprises an FRI nucleotide sequence which encodes the
polypeptide of Fig 6.

SJP B14 20
4 A nucleic acid as claimed in claim 3 wherein the FRI
nucleotide sequence consists of any of:

- (i) the sequence of Fig 4;
- (ii) the sequence of Fig 5;
- 20 (iii) bases 362-2188 inclusive of Fig 5;
or is degeneratively equivalent to any of these.

SJP B14 25
5 An isolated nucleic acid which comprises a variant
sequence which is a homologous variant of the FRI nucleotide
sequence of claim 4 and which shares at least 60% identity
therewith, said nucleic acid being capable of specifically
altering the flowering time of a plant into which the nucleic
acid is introduced.

SJP B14 30
6 A nucleic acid as claimed in claim 5 wherein the variant
sequence encodes a polypeptide which is capable of
specifically altering the flowering time of a plant into
which the nucleic acid is introduced.

SJP B14 35
7 A nucleic acid as claimed in claim 5 or claim 6 wherein
the variant sequence is an FRI allele.

SJP B14 40
8 A nucleic acid as claimed in claim 5 or claim 6 wherein
the variant sequence is an FRI orthologue obtainable from a
plant species other than *Arabidopsis thaliana*.

9. A nucleic acid as claimed in claim 5 or claim 6 wherein the variant sequence is a derivative of the FRI nucleotide sequence of claim 4 by way of one or more of addition, insertion, deletion or substitution of the FRI nucleotide sequence.

10. An isolated nucleic acid which comprises a sequence which the complement of the FRI or variant nucleotide sequence of any one of claim 1 to 9.

11. An isolated nucleic acid for use as a probe or primer, said nucleic acid having a sequence of at least about 16-24 nucleotides in length, which sequence is present in either the FRI nucleotide sequence of claim 4 or the complement thereof.

12. A process for producing a nucleic acid as claimed in claim 9 which process comprises the step of modifying a FRI nucleotide sequence of claim 4.

13. A method for identifying or cloning a nucleic acid as claimed in any of claims 1 to 10, which method employs a probe or primer of claim 11.

14. A method for determining the presence of a nucleic acid as claimed in any of claims 1 to 10 within the genetic context of a plant, which method employs a probe or primer of claim 11.

15. A method as claimed in claim 13 or claim 14, which method comprises the steps of:

(a) providing a preparation of nucleic acid from a plant cell;

35 (b) providing a nucleic acid molecule which is a probe of claim 11,

(c) contacting nucleic acid in said preparation with said

nucleic acid molecule under conditions for hybridisation, and,

(d) identifying a nucleic acid variant if present by its hybridisation with said nucleic acid molecule.

5

16. A method as claimed in claim 13 or claim 14, which method comprises the steps of:

(a) providing a preparation of nucleic acid from a plant cell;

(b) providing a pair of nucleic acid molecule primers suitable for PCR, at least one of said primers being a primer of claim 11,

(c) contacting nucleic acid in said preparation with said primers under conditions for performance of PCR,

(d) performing PCR and determining the presence or absence of an amplified PCR product.

15

17. A method of selecting a plant having a desired allele of the FRI gene, which method employs a probe or primer of claim 11 as a marker.

20

18. A recombinant vector which comprises the nucleic acid of any one of claims 1 to 10.

25

19. A vector as claimed in claim wherein the nucleic acid comprised in the vector is further capable of modulating VRN2 and/or FLC expression in a plant in which the nucleic acid is transcribed.

30

20. A vector as claimed in claim 18 or claim 19 wherein the nucleic acid is operably linked to a promoter for transcription in a host cell, wherein the promoter is optionally an inducible promoter.

35

21. A vector as claimed in any one of claims 18 to 20 which is a plant vector.

22. A method which comprises the step of introducing the vector of any one of claims 18 to 21 into a host cell, and optionally causing or allowing recombination between the vector and the host cell genome such as to transform the host cell.

23. A host cell containing or transformed with a heterologous nucleic acid of any one of claims 1 to 10.

10 24. A host cell as claimed in claim 23 which is a plant cell, optionally present in a plant.

25. A method for producing a transgenic plant, which method comprises the steps of:

15 (a) performing a method as claimed in claim 22,
(b) regenerating a plant from the transformed plant cell.

26. A transgenic plant which is obtainable by the method of claim 25, or which is a clone, or selfed or hybrid progeny or other descendant of said transgenic plant,
20 which in each case includes the plant cell of claim 24.

27. A plant as claimed in claim 26 which is selected from the list consisting of: sugar beet; a Brassica such as 25 cauliflower, broccoli, cabbage, spinach, curly kale, *B. napus*; potato; lettuce; a culinary herb.

28. A part of propagule from a plant as claimed in claim 26 or claim 27, which in either case includes the plant cell of 30 claim 24.

29. An isolated polypeptide which is encoded by the FRI nucleotide sequence of any one of claims 1 to 9.

35 30. A polypeptide as claimed in claim 29 which comprises an amino acid sequence which consists of the sequence of Fig 6.

31. A polypeptide as claimed in claim 29 which is a fragment of the polypeptide of claim 30.

32. A method of making the polypeptide of any one of claims 29 to 31, which method comprises the step of causing or allowing expression from a nucleic acid of any one of claims 1 to 9 in a suitable host cell.

33. An antibody having specific binding affinity for the polypeptide of claim 30.

34. A polypeptide which comprises the antigen-binding site of the antibody of claim 34.

15 35. A method for influencing or affecting flowering time in a plant, which method comprises the step of causing or allowing expression of a nucleic acid as claimed in any one of claims 1 to 10 within the cells of the plant, following an earlier step of introducing the nucleic acid into a cell of the plant or an ancestor thereof.

36. A method as claimed in claim 35 for delaying flowering time in a plant, wherein the nucleic acid is a nucleic acid as claimed in any one of claims 2 to 9.

25 37. A method as claimed in claim 35 for accelerating flowering time in a plant, which method comprises any of the following steps of:
(i) causing or allowing transcription from a nucleic acid as claimed in claim 10 in the plant such as to reduce FRI expression by an antisense mechanism;
30 (ii) causing or allowing transcription from a nucleic acid as claimed in any one of claims 2 to 9 or a part thereof such as to reduce FRI expression by co-suppression;
35 (iii) use of nucleic acid encoding a ribozyme specific for a nucleic acid as claimed in any one of claims 2 to 9.

61

Sub B¹⁴ 7
38. A method as claimed in ~~claim 37~~ wherein the plant is a soft fruit or maize.

Sub B¹⁴ 7
39. A method as claimed in any one of claims 35 to 38 which further comprises use of a nucleic acid capable of modulating VRN2 expression or FLC expression.

Sub B¹⁴ 7 10
40. An isolated nucleic acid molecule which comprises a nucleotide sequence which encodes the promoter sequence obtainable from the FRI locus of a plant, or a derivative of said sequence.